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REMARKS

FEB 20 2007

The application has been reviewed in light of the Office Action dated November 17, 2006. Claims 1-21 were pending. By this Amendment, new claims 22-35 have been added, claims 7 and 8 have been amended to remove multi-dependencies therein, claims 1, 3 and 6 have been amended to place the claims in better form for examination and to clarify the claimed subject matter. Accordingly, claims 1-35 are now pending, with claims 1 and 34 being in independent form.

Claims 9-21 were objected to under 37 C.F.R. 1.75(c) as purportedly in improper form.

Applicant notes that claims 9-21 are not in multi-dependent form.

However, by this Amendment, claims 7 and 8 have been amended to remove multi-dependencies therein.

Withdrawal of the objection to the claims is respectfully requested.

Claims 1-3, 6, and 8 were rejected under 35 U.S.C. § 102(a) as purportedly anticipated by US 2005/0083056 A1 (Harvey '056). Claims 1-3, 6, 7, 9-13 and 18-20 were rejected under 35 U.S.C. § 102(a) as purportedly anticipated by US 2005/0068032 A1 (Harvey '032).

Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claim 1 is patentable over the cited art, for at least the following reasons.

This application relates to a magnetic resonance imaging (MRI) apparatus comprising a pair of static magnetic field generating sources opposingly disposed on the sides of an imaging space and a gradient magnetic field generating part disposed on the imaging space side of each static magnetic field generating source for applying a gradient magnetic field to the imaging

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space. Applicant devised an improved MRI apparatus having a configuration that reduces vibration of a gradient magnetic field coil and cables.

When each static magnetic field generating source comprises a magnetic field generating coil and a closed vessel enclosing the magnetic field generating coil inside, and the gradient magnetic field generating part is supported on a face of the closed vessel on the imaging space side, Applicant found that it is advantageous that at least one of the closed vessel has a rigid structure for preventing transmission of vibration generated by the gradient magnetic field generating part to other members via the closed vessel, and particularly that the rigid structure has a rigid reinforcing member provided on the side confronting the face on the imaging space side of the closed vessel. Independent claim 1 addresses these features, as well as additional features.

Such features are neither taught nor suggested by the cited art.

Harvey '056, as understood by Applicant, proposes a structure for an MRI apparatus which is directed to the problem of high noise level caused by dynamically varying forces as a result of the magnetic field.

It is contended that Harvey '056, [0031], proposes a rigid structure which comprises a rigid reinforcing member fixed on the face confronting the face on the imaging space side of the closed vessel.

Harvey '056, [0031], states as follows:

[0031] In the exemplary embodiment shown in FIG. 1, the holding elements 9 are designed as columns and mounted on the housings 8 of the cryostats 3 by means of damping elements 10. The mounting takes place exclusively in regions of increased rigidity of the housing 8 of the cryostats 3. The damping elements 10 are constructed here as rings that are composed of an elastic material suitable for damping. The column-shaped holding elements 9 are each provided with a central bore 11 that has a

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longitudinal extension parallel to the central recess 7. The holding elements 9 are of a modular construction such that a screw joint 12 makes splitting into two parts 9a, 9b possible in each case. That part 9a of the holding element 9 that is situated at the side of the gradient coil device 4 is in each case firmly joined to the gradient coil device 4. A bolt 13 of the screw joint 12 extends in the direction of the examination volume 6, through the gradient coil device 4, and is in each case joined to the cryostat 3.

Thus, the holding element 9 in the apparatus proposed in Harvey '056 is nothing more than means for supporting the gradient magnetic coil on the housing 8. As described in Harvey '056, [0031] and [0033], the holding element 9 is mounted on the housing 8 (closed vessel) by two annular damping elements 10. The gap 14 is provided between holding element 9 and the housing 8, except the portion the damping elements 10 are provided, in order to avoid mechanical coupling (see Harvey '056, [0032] and Fig. 1). Further, the damping elements 10 are made of an elastic material suitable for damping.

Since the holding element 9 in the apparatus proposed in Harvey '056 is in contact with the housing 8 only through the damping elements 10, and the gap 14 is provided the portion except the damping elements 10 in order to avoid the mechanical coupling, it is essentially impossible for the holding element 9 to act to reinforce the rigidity of the housing 8 (the closed vessel), and to be the rigid reinforcing member as provided by the subject matter of claim 1 as amended.

In addition, the holding element 9 in the apparatus proposed in Harvey '056 is not provided on the side confronting the face on the imaging space side of the housing 8, but rather is provided in the recess of the housing 8.

Therefore, Harvey '056, [0032] fails to teach or suggest several features of the subject matter of claim 1 as amended.

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Harvey '032, as understood by Applicant, proposes a configuration for an open MRI imaging magnet system.

It is contended that Harvey '032, [0023], proposes a rigid structure which has a rigid reinforcing member connecting a face on the imaging space side and a face confronting the face of the closed vessel inside the closed vessel.

Harvey '032, [0023], states as follows:

[0023] Although not illustrated in FIGS. 1 and 2, it is noted that it is possible within the scope of the invention to use the central passage of at least one of the two housings also as a feed-through for electrical RF cables for energizing RF coil units 11, 12. Within this passage also shim irons or shim coils could be accommodated. The central passage furthermore enables unique attachment features for the gradient coil units to be attached to the associated housing. For this purpose resilient members may be present between the gradient coil unit and the associated housing. Finally it is noted that the central passage can also be used as a cooling conduit itself for the open MRI magnet system or more specifically for the gradient coil units, or that it may accommodate cooling ducts for cooling air.

Thus, the attachment proposed in Harvey '032, [0023], merely constitutes means for attaching the gradient magnetic coil to the housing. No teaching or suggestion is provided in Harvey '032 that the attachment reinforces the rigidity of the housing (the closed vessel).

Further, Harvey '032 teaches that the resilient members may be present between the gradient coil unit and the associated housing. When the resilient members are present in such a manner, the attachment may not act as reinforcing rigidity of the housing.

Applicant simply does not find teaching or suggestion in the cited art of a magnetic resonance imaging apparatus wherein each static magnetic field generating source comprises a magnetic field generating coil and a closed vessel enclosing the magnetic field generating coil inside, the gradient magnetic field generating part is supported on a face of the closed vessel on

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the imaging space side, at least one of the closed vessel has a rigid structure for preventing transmission of vibration generated by the gradient magnetic field generating part to other members via the closed vessel, and the rigid structure has a rigid reinforcing member provided on the side confronting the face on the imaging space side of the closed vessel, as provided by the subject matter of amended claim 1.

New independent claim 34 is patentably distinct from the cited art for at least similar reasons.

Accordingly, for at least the above-stated reasons, Applicant respectfully submits that independent claims 1 and 34, and the claims depending therefrom, are patentable over the cited art.

The Office Action indicates that claims 4, 5, 14-17 and 21 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, since independent claim 1 is submitted to be patentable over the cited art, no changes to the form of claims 4, 5, 14-17 and 21 are believed to be necessary.

In view of the amendments to the claims and remarks hereinabove, Applicant submits that the application is now in condition for allowance. Accordingly, Applicant earnestly solicits the allowance of the application.


If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that are required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

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If a telephone interview could advance the prosecution of this application, the Examiner  
is respectfully requested to call the undersigned attorney.

Respectfully submitted,

  
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